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#7

SEQUENCE LISTING

<110> International Flower Developments Pty Ltd

<120> Genetic sequences encoding flavonoid pathway enzymes and uses therefor

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<140> 09/142108

<141> 1997-02-28

<150> PN8386

<151> 1996-03-01

<160> 41

<170> PatentIn Ver. 2.1

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<212> DNA

<213> Petunia x hybrida

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<221> CDS

<222> (50)..(1588)

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 Met His
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Leu	Pro	Pro	Gly	Pro	Arg	Pro	Trp	Pro	Ile	Val	Gly	Asn	Leu	Pro	His	
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Ala His Thr Tyr Asp Trp Ala Leu Ala Asp Gly Leu Met Pro Glu Lys	
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 Ser Lys Met Lys Lys Leu His Lys Arg Leu Asp Asn Phe Met Ser Asn
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 Gly Lys Phe Ser Ala Thr Glu Ile Lys Ala Leu Leu Leu Asp Leu Phe
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 Cys Ala Gly Leu Ser Leu Gly Leu Arg Met Val Gln Leu Met Thr Ala
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 60 65 70

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 Val His Gly Pro Leu Ile His Leu Lys Met Gly Phe Val His Val Val
 75 80 85

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 Val Ala Ser Ser Ala Ser Val Ala Glu Lys Phe Leu Lys Val His Asp
 90 95 100

gca aac ttc tcg agc agg cct ccc aat tcg ggt gca aaa cac gtg gcc 450
 Ala Asn Phe Ser Ser Arg Pro Pro Asn Ser Gly Ala Lys His Val Ala
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tac aac tat cag gac ttg gtc ttt gct cct tat ggc cca cgc tgg cgg 498
 Tyr Asn Tyr Gln Asp Leu Val Phe Ala Pro Tyr Gly Pro Arg Trp Arg
 125 130 135

atg ctc agg aaa atc tgt gca ctc cac ctc ttc tcc gcc aaa gcc ttg 546
 Met Leu Arg Lys Ile Cys Ala Leu His Leu Phe Ser Ala Lys Ala Leu
 140 145 150

aac gac ttc aca cac gtc aga cag gat gag gtg ggg atc ctc act cgc 594
 Asn Asp Phe Thr His Val Arg Gln Asp Glu Val Gly Ile Leu Thr Arg
 155 160 165

gtt cta gca gat gca gga gaa acg ccg ttg aaa tta ggg cag atg atg 642
 Val Leu Ala Asp Ala Gly Thr Pro Leu Lys Leu Gly Gln Met Met
 170 175 180

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gtg Val	gtt Val	gga Gly	cac His	gca Ala 205	gac Asp	tca Ser	aag Lys	gcg Ala 210	gag Glu	gag Glu	ttt Phe	aag Lys	gca Ala 215	atg Met	gta Val	738
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ctc Leu	acc Thr	gac Asp	gta Val 300	gaa Glu	att Ile	aaa Lys	gcg Ala	ttg Leu 305	ctc Leu	ttg Leu	aac Asn	ttg Leu	ttt Phe 310	gct Ala	gca Ala	1026
gga Gly	act Thr	gac Asp 315	aca Thr	aca Thr	tca Ser	agc Ser	act Thr 320	gtg Val	gaa Glu	tgg Trp	tgc Cys	ata Ile 325	gct Ala	gag Glu	tta Leu	1074
gta Val 330	cga Arg	cat His	cct Pro	gaa Glu	atc Ile	ctt Leu 335	gcc Ala	caa Gln	gtc Val	caa Gln	aaa Lys 340	gaa Glu	ctc Leu	gac Asp	tct Ser	1122
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cca Pro	ttc Phe	ctc Leu	caa Gln 365	gcg Ala	gtc Val	gtc Val	aag Lys	gaa Glu	aat Asn 370	ttc Phe	cga Arg	ctc Leu	cat His	ccc Pro 375	tcc Ser	1218
acc Thr	ccg Pro	ctc Leu	tcc Ser 380	cta Leu	ccg Pro	agg Arg	atc Ile	gca Ala 385	cat His	gag Glu	agt Ser	tgt Cys	gaa Glu 390	gtg Val	aat Asn	1266
gga Gly	tac Tyr	ttg Leu 395	att Ile	cca Pro	aag Lys	ggg Gly	tcg Ser 400	aca Thr	ctt Leu	ctt Leu	gtc Val	aat Asn 405	gtt Val	tgg Trp	gca Ala	1314
att Ile 410	gct Ala	cgc Arg	gat Asp	cca Pro	aat Asn	gtg Val 415	tgg Trp	gat Asp	gaa Glu	cca Pro	cta Leu 420	gag Glu	ttc Phe	cgg Arg	cct Pro	1362
gaa Glu 425	cga Arg	ttc Phe	ttg Leu	aag Lys	ggc Gly 430	ggg Gly	gaa Glu	aag Lys	cct Pro	aat Asn 435	gtc Val	gat Asp	gtt Val	aga Arg	ggg Gly 440	1410

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 Gly Met Ser Leu Gly Ile Arg Met Val Gln Leu Leu Thr Ala Thr Leu
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 aac cat gcg ttt gac ttt gat ttg gcg gat gga cag ttg cct gaa agc 1554
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 Leu Asn Met Glu Glu Ala Tyr Gly Leu Thr Leu Gln Arg Ala Asp Pro
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 Tyr Ser Phe Leu Asn Lys Lys Val Lys Pro Leu Pro Pro Gly Pro Lys
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 Pro Trp Pro Ile Val Gly Asn Leu Pro His Leu Gly Pro Lys Pro His
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 Gln Ser Met Ala Ala Leu Ala Arg Val His Gly Pro Leu Ile His Leu
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 Lys Met Gly Phe Val His Val Val Val Ala Ser Ser Ala Ser Val Ala
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 Glu Lys Phe Leu Lys Val His Asp Ala Asn Phe Ser Ser Arg Pro Pro
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 Asn Ser Gly Ala Lys His Val Ala Tyr Asn Tyr Gln Asp Leu Val Phe
 115 120 125
 Ala Pro Tyr Gly Pro Arg Trp Arg Met Leu Arg Lys Ile Cys Ala Leu
 130 135 140
 His Leu Phe Ser Ala Lys Ala Leu Asn Asp Phe Thr His Val Arg Gln
 145 150 155 160
 Asp Glu Val Gly Ile Leu Thr Arg Val Leu Ala Asp Ala Gly Glu Thr
 165 170 175
 Pro Leu Lys Leu Gly Gln Met Met Asn Thr Cys Ala Thr Asn Ala Ile
 180 185 190
 Ala Arg Val Met Leu Gly Arg Arg Val Val Gly His Ala Asp Ser Lys
 195 200 205
 Ala Glu Glu Phe Lys Ala Met Val Val Glu Leu Met Val Leu Ala Gly
 210 215 220
 Val Phe Asn Leu Gly Asp Phe Ile Pro Pro Leu Glu Lys Leu Asp Leu
 225 230 235 240
 Gln Gly Val Ile Ala Lys Met Lys Lys Leu His Leu Arg Phe Asp Ser
 245 250 255
 Phe Leu Ser Lys Ile Leu Gly Asp His Lys Ile Asn Ser Ser Asp Glu
 260 265 270

Thr	Lys	Gly	His	Ser	Asp	Leu	Leu	Asn	Met	Leu	Ile	Ser	Leu	Lys	Asp	
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Ala	Asp	Asp	Ala	Glu	Gly	Gly	Arg	Leu	Thr	Asp	Val	Glu	Ile	Lys	Ala	
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Leu	Leu	Leu	Asn	Leu	Phe	Ala	Ala	Gly	Thr	Asp	Thr	Thr	Ser	Ser	Thr	
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Gln	Val	Gln	Lys	Glu	Leu	Asp	Ser	Val	Val	Gly	Lys	Asn	Arg	Val	Val	
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Lys	Glu	Ala	Asp	Leu	Ala	Gly	Leu	Pro	Phe	Leu	Gln	Ala	Val	Val	Lys	
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Ala	His	Glu	Ser	Cys	Glu	Val	Asn	Gly	Tyr	Leu	Ile	Pro	Lys	Gly	Ser	
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Thr	Leu	Leu	Val	Asn	Val	Trp	Ala	Ile	Ala	Arg	Asp	Pro	Asn	Val	Trp	
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Asp	Glu	Pro	Leu	Glu	Phe	Arg	Pro	Glu	Arg	Phe	Leu	Lys	Gly	Gly	Glu	
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Lys	Pro	Asn	Val	Asp	Val	Arg	Gly	Asn	Asp	Phe	Glu	Leu	Ile	Pro	Phe	
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Val	Gln	Leu	Leu	Thr	Ala	Thr	Leu	Asn	His	Ala	Phe	Asp	Phe	Asp	Leu	
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Ala	Asp	Gly	Gln	Leu	Pro	Glu	Ser	Leu	Asn	Met	Glu	Glu	Ala	Tyr	Gly	
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Asp	Gly	Gly	Ser	Leu	Thr	Asp	Thr	Glu	Ile	Lys	Ala	Leu	Leu	Leu	Asn	
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atg ttc aca gct gga act gac acg tca gca agt acg gtg gac tgg gct 144																
Met	Phe	Thr	Ala	Gly	Thr	Asp	Thr	Ser	Ala	Ser	Thr	Val	Asp	Trp	Ala	
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ata gct gaa ctt atc cgt cac ccg gat ata atg gtt aaa gcc caa gaa 192																
Ile	Ala	Glu	Leu	Ile	Arg	His	Pro	Asp	Ile	Met	Val	Lys	Ala	Gln	Glu	
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gaa ctt gat att gtt gtg ggc cgt gac agg cct gtt aat gaa tca gac 240																
Glu	Leu	Asp	Ile	Val	Val	Gly	Arg	Asp	Arg	Pro	Val	Asn	Glu	Ser	Asp	
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atc gct cag ctt cct tac ctt cag gcg gtt atc aaa gag aat ttc agg 288																
Ile	Ala	Gln	Leu	Pro	Tyr	Leu	Gln	Ala	Val	Ile	Lys	Glu	Asn	Phe	Arg	
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 Leu His Pro Pro Thr Pro Leu Ser Leu Pro His Ile Ala Ser Glu Ser
 100 105 110
 tgt gag atc aac ggc tac cat atc ccg aaa gga tcg act cta ttt gac 384
 Cys Glu Ile Asn Gly Tyr His Ile Pro Lys Gly Ser Thr Leu Phe Asp
 115 120 125
 gga cat atg ggc cta ggc cgt gac ccg gat caa tgg tcc gac ccg tta 432
 Gly His Met Gly Leu Gly Arg Asp Pro Asp Gln Trp Ser Asp Pro Leu
 130 135 140
 gca ttt aaa ccc gag aga ttc tta ccc ggt ggt gaa aaa tcc ggc gtt 480
 Ala Phe Lys Pro Glu Arg Phe Leu Pro Gly Gly Glu Lys Ser Gly Val
 145 150 155 160
 gat gtg aaa gga agc gat ttc gag cta ata ccg ttc ggg gct ggg agg 528
 Asp Val Lys Gly Ser Asp Phe Glu Leu Ile Pro Phe Gly Ala Gly Arg
 165 170 175
 cca atc tgt gca ggt tta agt tta ggg cta cgt aca gat tta agt tgc 576
 Pro Ile Cys Ala Gly Leu Ser Leu Gly Leu Arg Thr Asp Leu Ser Cys
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 Leu His Ala Asn Val Ala His Lys His Leu Ile Gly Asn Phe Ser Trp
 195 200 205
 aga agt tac gcc gga caa cct gaa tat cgc agg aaa agt tta ctg ggc 672
 Arg Ser Tyr Ala Gly Gln Pro Glu Tyr Arg Arg Lys Ser Leu Leu Gly
 210 215 220
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 Phe Thr Leu Gln Arg Ala Val Pro Ser Val Val His Pro Lys Pro Arg
 225 230 235 240
 ttg gcc ccg aac gtt tat gga ccc cgg gtc ggc tta aaa ttt aac ttt 768
 Leu Ala Pro Asn Val Tyr Gly Pro Arg Val Gly Leu Lys Phe Asn Phe
 245 250 255
 gct tct tgg aca agg tat atg gct tgc acg aaa cta acg ttt taa 813
 Ala Ser Trp Thr Arg Tyr Met Ala Cys Thr Lys Leu Thr Phe
 260 265 270
 cacaccgtag ttgatccgg agttagcttt atgtaagaac gtgtaacgcc aaatcaagcc 873
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 35 40 45
 Ile Ala Glu Leu Ile Arg His Pro Asp Ile Met Val Lys Ala Gln Glu
 50 55 60

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Ile	Ala	Gln	Leu	Pro	Tyr	Leu	Gln	Ala	Val	Ile	Lys	Glu	Asn	Phe	Arg	85	90	95	
Leu	His	Pro	Pro	Thr	Pro	Leu	Ser	Leu	Pro	His	Ile	Ala	Ser	Glu	Ser	100	105	110	
Cys	Glu	Ile	Asn	Gly	Tyr	His	Ile	Pro	Lys	Gly	Ser	Thr	Leu	Phe	Asp	115	120	125	
Gly	His	Met	Gly	Leu	Gly	Arg	Asp	Pro	Asp	Gln	Trp	Ser	Asp	Pro	Leu	130	135	140	
Ala	Phe	Lys	Pro	Glu	Arg	Phe	Leu	Pro	Gly	Gly	Glu	Lys	Ser	Gly	Val	145	150	155	160
Asp	Val	Lys	Gly	Ser	Asp	Phe	Glu	Leu	Ile	Pro	Phe	Gly	Ala	Gly	Arg	165	170	175	
Pro	Ile	Cys	Ala	Gly	Leu	Ser	Leu	Gly	Leu	Arg	Thr	Asp	Leu	Ser	Cys	180	185	190	
Leu	His	Ala	Asn	Val	Ala	His	Lys	His	Leu	Ile	Gly	Asn	Phe	Ser	Trp	195	200	205	
Arg	Ser	Tyr	Ala	Gly	Gln	Pro	Glu	Tyr	Arg	Arg	Lys	Ser	Leu	Leu	Gly	210	215	220	
Phe	Thr	Leu	Gln	Arg	Ala	Val	Pro	Ser	Val	Val	His	Pro	Lys	Pro	Arg	225	230	235	240
Leu	Ala	Pro	Asn	Val	Tyr	Gly	Pro	Arg	Val	Gly	Leu	Lys	Phe	Asn	Phe	245	250	255	
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Met Ala Thr Leu Phe Leu	
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Thr Ile Leu Leu Ala Thr Val Leu Phe Leu Ile Leu Arg Ile Phe Ser	
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His Arg Arg Asn Arg Ser His Asn Asn Arg Leu Pro Pro Gly Pro Asn	
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Pro Trp Pro Ile Ile Gly Asn Leu Pro His Met Gly Thr Lys Pro His	
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Arg Thr Leu Ser Ala Met Val Thr Thr Tyr Gly Pro Ile Leu His Leu	
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Arg Leu Gly Phe Val Asp Val Val Val Ala Ala Ser Lys Ser Val Ala	
75 80 85	
gag cag ttc ttg aaa ata cac gac gcc aat ttc gct agc cga cca cca	1783
Glu Gln Phe Leu Lys Ile His Asp Ala Asn Phe Ala Ser Arg Pro Pro	
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aac tca gga gcc aaa cac atg gca tat aac tat caa gat ctt gtc ttt	1831
Asn Ser Gly Ala Lys His Met Ala Tyr Asn Tyr Gln Asp Leu Val Phe	
105 110 115	

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Ala Pro Tyr Gly His Arg Trp Arg Leu Leu Arg Lys Ile Ser Ser Val	
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His Leu Phe Ser Ala Lys Ala Leu Glu Asp Phe Lys His Val Arg Gln	
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cag gaa gag gtt gga acg cta acg cgg gag cta gtg cgt gtt ggc acg	2695
Glu Glu Val Gly Thr Leu Thr Arg Glu Leu Val Arg Val Gly Thr	
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Lys Pro Val Asn Leu Gly Gln Leu Val Asn Met Cys Val Val Asn Ala	
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Leu Gly Arg Glu Met Ile Gly Arg Arg Leu Phe Gly Ala Asp Ala Asp	
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His Lys Ala Asp Glu Phe Arg Ser Met Val Thr Glu Met Met Ala Leu	
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Ala Gly Val Phe Asn Ile Gly Asp Phe Val Pro Ser Leu Asp Trp Leu	
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Asp Leu Gln Gly Val Ala Gly Lys Met Lys Arg Leu His Lys Arg Phe	
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gac gct ttt cta tcg tcg att ttg aaa gag cac gaa atg aac ggt caa	2983
Asp Ala Phe Leu Ser Ser Ile Leu Lys Glu His Glu Met Asn Gly Gln	
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Asp Gln Lys His Thr Asp Met Leu Ser Thr Leu Ile Ser Leu Lys Gly	
115 120 125	

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Gly Thr Asp Thr Ser Ala Ser Thr Val Asp Trp Ala Ile Ala Glu Leu	
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Ile Arg His Pro Asp Ile Met Val Lys Ala Gln Glu Glu Leu Asp Ile	
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Val Val Gly Arg Asp Arg Pro Val Asn Glu Ser Asp Ile Ala Gln Leu	
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Pro Tyr Leu Gln	
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agcgagctat tgttgttaat ccggttttgg tttaaaacag gcg gtt atc aaa gag	3435
Ala Val Ile Lys Glu	
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Asn Phe Arg Leu His Pro Pro Thr Pro Leu Ser Leu Pro His Ile Ala	
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Ser Glu Ser Cys Glu Ile Asn Gly Tyr His Ile Pro Lys Gly Ser Thr	
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Leu Leu Thr Asn Ile Trp Ala Ile Ala Arg Asp Pro Asp Gln Trp Ser	
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gac ccg tta gca ttt aaa ccc gag aga ttc tta ccc ggt ggt gaa aaa	3627
Asp Pro Leu Ala Phe Lys Pro Glu Arg Phe Leu Pro Gly Gly Glu Lys	
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Ser Gly Val Asp Val Lys Gly Ser Asp Phe Glu Leu Ile Pro Phe Gly	
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Ala Gly Arg Arg Ile Cys Ala Gly Leu Ser Leu Gly Leu Arg Thr Ile	
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Gln Phe Leu Thr Ala Thr Leu Val Gln Gly Phe Asp Trp Glu Leu Ala	
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Ala Pro Asn Val Tyr Gly Leu Gly Ser Gly	
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Leu Pro Pro Gly Pro Asn Pro Trp Pro Ile Ile Gly Asn Leu Pro His
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Met Gly Thr Lys Pro His Arg Thr Leu Ser Ala Met Val Thr Thr Tyr
50 55 60
Gly Pro Ile Leu His Leu Arg Leu Gly Phe Val Asp Val Val Val Ala
65 70 75 80
Ala Ser Lys Ser Val Ala Glu Gln Phe Leu Lys Ile His Asp Ala Asn
85 90 95
Phe Ala Ser Arg Pro Pro Asn Ser Gly Ala Lys His Met Ala Tyr Asn
100 105 110
Tyr Gln Asp Leu Val Phe Ala Pro Tyr Gly His Arg Trp Arg Leu Leu
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130 135 140

Phe Lys His Val Arg Gln
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35 40 45
Lys Ala Asp Glu Phe Arg Ser Met Val Thr Glu Met Met Ala Leu Ala
50 55 60
Gly Val Phe Asn Ile Gly Asp Phe Val Pro Ser Leu Asp Trp Leu Asp
65 70 75 80
Leu Gln Gly Val Ala Gly Lys Met Lys Arg Leu His Lys Arg Phe Asp
85 90 95
Ala Phe Leu Ser Ser Ile Leu Lys Glu His Glu Met Asn Gly Gln Asp
100 105 110
Gln Lys His Thr Asp Met Leu Ser Thr Leu Ile Ser Leu Lys Gly Thr
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Leu Leu Leu
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 35 40 45
 Pro Asp Gln Trp Ser Asp Pro Leu Ala Phe Lys Pro Glu Arg Phe Leu
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 Pro Gly Gly Glu Lys Ser Gly Val Asp Val Lys Gly Ser Asp Phe Glu
 65 70 75 80
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 85 90 95
 Gly Leu Arg Thr Ile Gln Phe Leu Thr Ala Thr Leu Val Gln Gly Phe
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 Asp Trp Glu Leu Ala Gly Gly Val Thr Pro Glu Lys Leu Asn Met Glu
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 Phe Ala Val Phe Leu Phe Arg Leu Leu Phe Ser Gly Lys Ser Gln Arg 25
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 cac tcg ctc cct ctc cct cct ggc ccc aaa cca tgg ccg gtg gtt ggc 147
 His Ser Leu Pro Leu Pro Pro Gly Pro Lys Pro Trp Pro Val Val Gly 40
 30 35
 aac tta cct cac ttg ggc ccc ttc ccg cac cac tcc atc gcg gag ttg 195
 Asn Leu Pro His Leu Gly Pro Phe Pro His His Ser Ile Ala Glu Leu 55
 45 50

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Ala Lys Lys His Gly Pro Leu Met His Leu Arg Leu Gly Tyr Val Asp	
60 65 70	
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Val Val Val Ala Ala Ser Ala Ser Val Ala Ala Gln Phe Leu Lys Thr	
75 80 85 90	
cac gac gcc aat ttc tcc agc cga ccg ccc aac tcc ggc gcc aag cac	339
His Asp Ala Asn Phe Ser Ser Arg Pro Pro Asn Ser Gly Ala Lys His	
95 100 105	
ctc gcc tat aac tac cag gac ctc gtg ttc agg ccg tac ggt cca ccg	387
Leu Ala Tyr Asn Tyr Gln Asp Leu Val Phe Arg Pro Tyr Gly Pro Arg	
110 115 120	
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Trp Arg Met Phe Arg Lys Ile Ser Ser Val His Leu Phe Ser Gly Lys	
125 130 135	
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Ala Leu Asp Asp Leu Lys His Val Arg Gln Glu Glu Val Ser Val Leu	
140 145 150	
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Ala His Ala Leu Ala Asn Ser Gly Ser Lys Val Val Asn Leu Ala Gln	
155 160 165 170	
ctg ctg aac ctg tgc acg gtc aat gct cta gga agg gtg atg gta ggg	579
Leu Leu Asn Leu Cys Thr Val Asn Ala Leu Gly Arg Val Met Val Gly	
175 180 185	
cgg agg gtt ttc ggc gac ggc agc gga ggc gac gat ccg aag gcg gac	627
Arg Arg Val Phe Gly Asp Gly Ser Gly Gly Asp Asp Pro Lys Ala Asp	
190 195 200	
gag ttc aaa tcg atg gtg gtg gag atg atg gtg ttg gca gga gtg ttc	675
Glu Phe Lys Ser Met Val Val Glu Met Met Val Leu Ala Gly Val Phe	
205 210 215	
aac ata ggt gac ttc atc ccc tct ctc gaa tgg ctt gac ttg caa ggc	723
Asn Ile Gly Asp Phe Ile Pro Ser Leu Glu Trp Leu Asp Leu Gln Gly	
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Val Ala Ser Lys Met Lys Lys Leu His Lys Arg Phe Asp Asp Phe Leu	
235 240 245 250	
aca gcc att gtc gag gac cac aag aag ggc tcc ggc acg gcg ggg cac	819
Thr Ala Ile Val Glu Asp His Lys Lys Gly Ser Gly Thr Ala Gly His	
255 260 265	
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Val Asp Met Leu Thr Thr Leu Leu Ser Leu Lys Glu Asp Ala Asp Gly	
270 275 280	
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Glu Gly Gly Lys Leu Thr Asp Thr Glu Ile Lys Ala Leu Leu Asn	
285 290 295	
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Met Phe Thr Ala Gly Thr Asp Thr Ser Ser Ser Thr Val Glu Trp Ala	
300 305 310	

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Ile Ala Glu Leu Ile Arg His Pro His Met Leu Ala Arg Val Gln Lys	
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Glu Leu Asp Asp Phe Val Gly His Asp Arg Leu Val Thr Glu Ser Asp	
335 340 345	
ata ccc aac ctc cct tac ctc caa gcc gtg atc aag gaa acg ttc cga	1107
Ile Pro Asn Leu Pro Tyr Leu Gln Ala Val Ile Lys Glu Thr Phe Arg	
350 355 360	
ctc cac cca tcc act cct ctc tcg ttg cct cgt atg gca gcc gag agt	1155
Leu His Pro Ser Thr Pro Leu Ser Leu Pro Arg Met Ala Ala Glu Ser	
365 370 375	
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Cys Glu Ile Asn Gly Tyr His Ile Pro Lys Gly Ser Thr Leu Leu Val	
380 385 390	
aat gta tgg gcc ata tcg cgt gac ccg gct gaa tgg gcc gac cca ctg	1251
Asn Val Trp Ala Ile Ser Arg Asp Pro Ala Glu Trp Ala Asp Pro Leu	
395 400 405 410	
gag ttc aag ccc gag agg ttc ctg ccg ggg ggc gaa aag cct aat gtt	1299
Glu Phe Lys Pro Glu Arg Phe Leu Pro Gly Gly Glu Lys Pro Asn Val	
415 420 425	
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Asp Ile Arg Gly Asn Asp Phe Glu Val Ile Pro Phe Gly Ala Gly Arg	
430 435 440	
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Arg Ile Cys Ala Gly Met Ser Leu Gly Leu Arg Met Val His Leu Met	
445 450 455	
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Thr Ala Thr Leu Val His Ala Phe Asn Trp Ala Leu Ala Asp Gly Leu	
460 465 470	
acc gct gag aag tta aac atg gat gaa gca tat ggg ctc act cta caa	1491
Thr Ala Glu Lys Leu Asn Met Asp Glu Ala Tyr Gly Leu Thr Leu Gln	
475 480 485 490	
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Arg Ala Ala Pro Leu Met Val His Pro Arg Thr Arg Leu Ala Pro Gln	
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Ala Tyr Lys Thr Ser Ser Ser	
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 <212> PRT
 <213> Rosa hybrida

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Ser	Gly	Ser	Lys	Val	Val	Asn	Leu	Ala	Gln	Leu	Leu	Asn	Leu	Cys	Thr
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		195				200						205			
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Pro	Ser	Leu	Glu	Trp	Leu	Asp	Leu	Gln	Gly	Val	Ala	Ser	Lys	Met	Lys
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Lys	Leu	His	Lys	Arg	Phe	Asp	Asp	Phe	Leu	Thr	Ala	Ile	Val	Glu	Asp
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His	Pro	His	Met	Leu	Ala	Arg	Val	Gln	Lys	Glu	Leu	Asp	Asp	Phe	Val
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Val Leu Tyr Val Phe Leu Asn Leu Ser Ser Arg Lys Ser Ala Arg Leu	
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cca ccc ggg cca aca cca tgg cct ata gtc ggg aac tta cca cac ctt	144
Pro Pro Gly Pro Thr Pro Trp Pro Ile Val Gly Asn Leu Pro His Leu	
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ggc cca atc cca cac cac gca ctc gcg gcc tta gcc aag aag tac ggg	192
Gly Pro Ile Pro His His Ala Leu Ala Ala Leu Ala Lys Lys Tyr Gly	
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Ser Ala Gly Asn Ser Pro Val Gln Leu Gly Gln Leu Leu Asn Val Cys	
160 165 170 175	
gcc aca aac gcc tta gca cgg gta atg tta ggt agg aga gtt ttc gga	576
Ala Thr Asn Ala Leu Ala Arg Val Met Leu Gly Arg Arg Val Phe Gly	
180 185 190	
gac gga att gac agg tca gcc aat gag ttc aaa gat atg gta gta gag	624
Asp Gly Ile Asp Arg Ser Ala Asn Glu Phe Lys Asp Met Val Val Glu	
195 200 205	
tta atg gta tta gca gga gaa ttt aac ctt ggt gac ttt att cct gta	672
Leu Met Val Leu Ala Gly Glu Phe Asn Leu Gly Asp Phe Ile Pro Val	
210 215 220	

ctt gac cta ttc gac cta caa ggc att act aaa aaa atg aag aag ctt	720
Leu Asp Leu Phe Asp Leu Gln Gly Ile Thr Lys Lys Met Lys Lys Leu	
225 230 235	
cat gtt cgg ttc gat tca ttt ctt agt aag atc gtt gag gag cat aaa	768
His Val Arg Phe Asp Ser Phe Leu Ser Lys Ile Val Glu Glu His Lys	
240 245 250 255	
acg gca cct ggt ggg ttg ggt cat act gat ttg ctg agc acg ttg att	816
Thr Ala Pro Gly Gly Leu Gly His Thr Asp Leu Leu Ser Thr Leu Ile	
260 265 270	
tca ctt aaa gat gat gct gat att gaa ggt ggg aag ctt aca gat act	864
Ser Leu Lys Asp Asp Ala Asp Ile Glu Gly Gly Lys Leu Thr Asp Thr	
275 280 285	
gaa atc aaa gct ttg ctt ctg aat tta ttc gct gcg gga aca gac aca	912
Glu Ile Lys Ala Leu Leu Leu Asn Leu Phe Ala Ala Gly Thr Asp Thr	
290 295 300	
tcc tct agt aca gta gaa tgg gca ata gcc gaa ctc att cgt cat cca	960
Ser Ser Ser Thr Val Glu Trp Ala Ile Ala Glu Leu Ile Arg His Pro	
305 310 315	
caa ata tta aaa caa gcc cga gaa gag ata gac gct gta gtt ggt caa	1008
Gln Ile Leu Lys Gln Ala Arg Glu Glu Ile Asp Ala Val Val Gly Gln	
320 325 330 335	
gac cgg ctt gta aca gaa ttg gac ttg agc caa cta aca tac ctc cag	1056
Asp Arg Leu Val Thr Glu Leu Asp Leu Ser Gln Leu Thr Tyr Leu Gln	
340 345 350	
gct ctt gtg aaa gag gtg ttt agg ctc cac cct tca acg cca ctc tcc	1104
Ala Leu Val Lys Glu Val Phe Arg Leu His Pro Ser Thr Pro Leu Ser	
355 360 365	
tta cca aga ata tca tcc gag agt tgt gag gtc gat ggg tat tat atc	1152
Leu Pro Arg Ile Ser Ser Glu Ser Cys Glu Val Asp Gly Tyr Tyr Ile	
370 375 380	
cct aag gga tcc aca ctc ctc gtt aac gtg tgg gcc att gcg cga gac	1200
Pro Lys Gly Ser Thr Leu Leu Val Asn Val Trp Ala Ile Ala Arg Asp	
385 390 395	
cca aaa atg tgg gcg gat cct ctt gaa ttt agg cct tct cgg ttt tta	1248
Pro Lys Met Trp Ala Asp Pro Leu Glu Phe Arg Pro Ser Arg Phe Leu	
400 405 410 415	
ccc ggg gga gaa aag ccc ggt gct gat gtt agg gga aat gat ttt gaa	1296
Pro Gly Gly Glu Lys Pro Gly Ala Asp Val Arg Gly Asn Asp Phe Glu	
420 425 430	
gtt ata cca ttt ggg gca gga cga agg att tgt gcg ggt atg agc cta	1344
Val Ile Pro Phe Gly Ala Gly Arg Arg Ile Cys Ala Gly Met Ser Leu	
435 440 445	
ggc ttg aga atg gtc cag ttg ctc att gca aca ttg gtc caa act ttt	1392
Gly Leu Arg Met Val Gln Leu Leu Ile Ala Thr Leu Val Gln Thr Phe	
450 455 460	
gat tgg gaa ctg gct aac ggg tta gag ccg gag atg ctc aac atg gaa	1440
Asp Trp Glu Leu Ala Asn Gly Leu Glu Pro Glu Met Leu Asn Met Glu	
465 470 475	

gaa gcg tat gga ttg acc ctt caa cgg gct gca ccc ttg atg gtt cac 1488
 Glu Ala Tyr Gly Leu Thr Leu Gln Arg Ala Ala Pro Leu Met Val His
 480 485 490 495

ccg aag ccg agg tta gct ccc cac gta tat gaa agt att taa 1530
 Pro Lys Pro Arg Leu Ala Pro His Val Tyr Glu Ser Ile
 500 505

ggactagttt ctcttttgcc tttttgtttc gcaaagggtta atgaataaac gatttcatga 1590

ctcagatagt tatgtaaaca attgtgtttg ctgtttatat atttatctat ttttctagaa 1650

caaaaaaaaaa 1660

<210> 17
 <211> 508
 <212> PRT
 <213> Chrysanthemum

<400> 17
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 Leu Tyr Val Phe Leu Asn Leu Ser Ser Arg Lys Ser Ala Arg Leu Pro
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 Pro Gly Pro Thr Pro Trp Pro Ile Val Gly Asn Leu Pro His Leu Gly
 35 40 45
 Pro Ile Pro His His Ala Leu Ala Ala Leu Ala Lys Lys Tyr Gly Pro
 50 55 60
 Leu Met His Leu Arg Leu Gly Cys Val Asp Val Val Val Ala Ala Ser
 65 70 75 80
 Ala Ser Val Ala Ala Gln Phe Leu Lys Val His Asp Ala Asn Phe Ala
 85 90 95
 Ser Arg Pro Pro Asn Ser Gly Ala Lys His Val Ala Tyr Asn Tyr Gln
 100 105 110
 Asp Leu Val Phe Ala Pro Tyr Gly Pro Arg Trp Arg Leu Leu Arg Lys
 115 120 125
 Ile Cys Ser Val His Leu Phe Ser Ala Lys Ala Leu Asp Asp Phe Arg
 130 135 140
 His Val Arg Gln Glu Glu Val Ala Val Leu Thr Arg Val Leu Leu Ser
 145 150 155 160
 Ala Gly Asn Ser Pro Val Gln Leu Gly Gln Leu Leu Asn Val Cys Ala
 165 170 175
 Thr Asn Ala Leu Ala Arg Val Met Leu Gly Arg Arg Val Phe Gly Asp
 180 185 190
 Gly Ile Asp Arg Ser Ala Asn Glu Phe Lys Asp Met Val Val Glu Leu
 195 200 205
 Met Val Leu Ala Gly Glu Phe Asn Leu Gly Asp Phe Ile Pro Val Leu
 210 215 220
 Asp Leu Phe Asp Leu Gln Gly Ile Thr Lys Lys Met Lys Lys Leu His
 225 230 235 240
 Val Arg Phe Asp Ser Phe Leu Ser Lys Ile Val Glu Glu His Lys Thr
 245 250 255
 Ala Pro Gly Gly Leu Gly His Thr Asp Leu Leu Ser Thr Leu Ile Ser
 260 265 270
 Leu Lys Asp Asp Ala Asp Ile Glu Gly Gly Lys Leu Thr Asp Thr Glu
 275 280 285
 Ile Lys Ala Leu Leu Leu Asn Leu Phe Ala Ala Gly Thr Asp Thr Ser
 290 295 300
 Ser Ser Thr Val Glu Trp Ala Ile Ala Glu Leu Ile Arg His Pro Gln
 305 310 315 320
 Ile Leu Lys Gln Ala Arg Glu Glu Ile Asp Ala Val Val Gly Gln Asp
 325 330 335
 Arg Leu Val Thr Glu Leu Asp Leu Ser Gln Leu Thr Tyr Leu Gln Ala
 340 345 350

Leu	Val	Lys	Glu	Val	Phe	Arg	Leu	His	Pro	Ser	Thr	Pro	Leu	Ser	Leu
		355					360					365			
Pro	Arg	Ile	Ser	Ser	Glu	Ser	Cys	Glu	Val	Asp	Gly	Tyr	Tyr	Ile	Pro
		370					375					380			
Lys	Gly	Ser	Thr	Leu	Leu	Val	Asn	Val	Trp	Ala	Ile	Ala	Arg	Asp	Pro
		385					390				395				400
Lys	Met	Trp	Ala	Asp	Pro	Leu	Glu	Phe	Arg	Pro	Ser	Arg	Phe	Leu	Pro
				405					410					415	
Gly	Gly	Glu	Lys	Pro	Gly	Ala	Asp	Val	Arg	Gly	Asn	Asp	Phe	Glu	Val
			420					425					430		
Ile	Pro	Phe	Gly	Ala	Gly	Arg	Arg	Ile	Cys	Ala	Gly	Met	Ser	Leu	Gly
		435					440					445			
Leu	Arg	Met	Val	Gln	Leu	Leu	Ile	Ala	Thr	Leu	Val	Gln	Thr	Phe	Asp
		450				455					460				
Trp	Glu	Leu	Ala	Asn	Gly	Leu	Glu	Pro	Glu	Met	Leu	Asn	Met	Glu	Glu
		465			470					475					480
Ala	Tyr	Gly	Leu	Thr	Leu	Gln	Arg	Ala	Ala	Pro	Leu	Met	Val	His	Pro
				485					490					495	
Lys	Pro	Arg	Leu	Ala	Pro	His	Val	Tyr	Glu	Ser	Ile				
			500					505							

<210> 18
 <211> 1815
 <212> DNA
 <213> Torenia

<220>
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 <222> (107)..(1633)

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catacatcat caccgaatac gcacgctact accactgcga ttagcc atg agt ccc 115
 Met Ser Pro
 1

tta gcc ttg atg atc ata agt acc tta tta ggg ttt ctc cta tac cac 163
 Leu Ala Leu Met Ile Ile Ser Thr Leu Leu Gly Phe Leu Leu Tyr His
 5 10 15

tct ctt cgc tta cta ctc ttc tcc ggc caa ggt cgc cga cta cta cca 211
 Ser Leu Arg Leu Leu Phe Ser Gly Gln Gly Arg Arg Leu Leu Pro
 20 25 30 35

cca ggt cca cgc ccg tgg ccg ctg gtg gga aat ctc ccg cac tta ggc 259
 Pro Gly Pro Arg Pro Trp Pro Leu Val Gly Asn Leu Pro His Leu Gly
 40 45 50

ccg aag cca cac gcc tcc atg gcc gag ctc gcg cga gcc tac gga ccc 307
 Pro Lys Pro His Ala Ser Met Ala Glu Leu Ala Arg Ala Tyr Gly Pro
 55 60 65

ctc atg cac cta aag atg ggg ttc gtc cac gtc gtg gtg gct tcg tcg 355
 Leu Met His Leu Lys Met Gly Phe Val His Val Val Val Ala Ser Ser
 70 75 80

gcg agc gcg gcg gag cag tgc ctg agg gtt cac gac gcg aat ttc ttg 403
 Ala Ser Ala Ala Glu Gln Cys Leu Arg Val His Asp Ala Asn Phe Leu
 85 90 95

agc agg cca ccc aac tcc ggc gcc aag cac gtc gct tac aac tac gag 451
 Ser Arg Pro Pro Asn Ser Gly Ala Lys His Val Ala Tyr Asn Tyr Glu
 100 105 110 115

gac	ttg	gtt	ttc	aga	ccg	tac	ggg	ccc	aag	tgg	agg	ctg	ttg	agg	aag	499
Asp	Leu	Val	Phe	Arg	Pro	Tyr	Gly	Pro	Lys	Trp	Arg	Leu	Leu	Arg	Lys	
				120					125					130		
ata	tgc	gct	cag	cat	att	ttc	tcc	gtc	aag	gct	atg	gat	gac	ttc	agg	547
Ile	Cys	Ala	Gln	His	Ile	Phe	Ser	Val	Lys	Ala	Met	Asp	Asp	Phe	Arg	
			135					140					145			
cgc	gtc	aga	gag	gaa	gag	gtg	gcc	atc	ctg	agt	cgc	gct	cta	gca	ggc	595
Arg	Val	Arg	Glu	Glu	Glu	Val	Ala	Ile	Leu	Ser	Arg	Ala	Leu	Ala	Gly	
		150					155					160				
aaa	agg	gcc	gta	ccc	ata	ggc	caa	atg	ctc	aac	gtg	tgc	gcc	aca	aac	643
Lys	Arg	Ala	Val	Pro	Ile	Gly	Gln	Met	Leu	Asn	Val	Cys	Ala	Thr	Asn	
	165					170					175					
gcc	cta	tct	cgc	gtc	atg	atg	ggg	cgg	cgc	gtg	gtg	ggc	cac	gcg	gat	691
Ala	Leu	Ser	Arg	Val	Met	Met	Gly	Arg	Arg	Val	Val	Gly	His	Ala	Asp	
180					185					190					195	
gga	acc	aac	gac	gcc	aag	gcg	gag	gag	ttc	aaa	gcc	atg	gtc	gtc	gag	739
Gly	Thr	Asn	Asp	Ala	Lys	Ala	Glu	Glu	Phe	Lys	Ala	Met	Val	Val	Glu	
				200					205					210		
ctc	atg	gtc	ctc	tcc	ggc	gtc	ttc	aac	atc	ggg	gat	ttc	atc	ccc	ttc	787
Leu	Met	Val	Leu	Ser	Gly	Val	Phe	Asn	Ile	Gly	Asp	Phe	Ile	Pro	Phe	
			215					220					225			
ctc	gag	cct	ctc	gac	ttg	cag	gga	gtg	gct	tcc	aag	atg	aag	aaa	ctc	835
Leu	Glu	Pro	Leu	Asp	Leu	Gln	Gly	Val	Ala	Ser	Lys	Met	Lys	Lys	Leu	
		230					235					240				
cac	gcg	cgg	ttc	gat	gca	ttc	ttg	acc	gag	att	gta	cga	gag	cgt	tgt	883
His	Ala	Arg	Phe	Asp	Ala	Phe	Leu	Thr	Glu	Ile	Val	Arg	Glu	Arg	Cys	
	245					250					255					
cat	ggg	cag	atc	aac	aac	agt	ggg	gct	cat	cag	gat	gat	ttg	ctt	agc	931
His	Gly	Gln	Ile	Asn	Asn	Ser	Gly	Ala	His	Gln	Asp	Asp	Leu	Leu	Ser	
260				265					270						275	
acg	ttg	att	tcg	ttc	aaa	ggg	ctt	gac	gat	ggc	gat	ggg	tcc	agg	ctc	979
Thr	Leu	Ile	Ser	Phe	Lys	Gly	Leu	Asp	Asp	Gly	Asp	Gly	Ser	Arg	Leu	
				280					285					290		
act	gac	aca	gaa	atc	aag	gcg	ctg	ctc	ttg	aac	ctt	ttg	gac	acg	acg	1027
Thr	Asp	Thr	Glu	Ile	Lys	Ala	Leu	Leu	Leu	Asn	Leu	Leu	Asp	Thr	Thr	
			295					300					305			
tcg	agc	acg	gtg	gaa	tgg	gcc	gta	gcc	gaa	ctc	cta	cgc	cac	cct	aag	1075
Ser	Ser	Thr	Val	Glu	Trp	Ala	Val	Ala	Glu	Leu	Leu	Arg	His	Pro	Lys	
			310				315					320				
aca	tta	gcc	caa	gtc	cgg	caa	gag	ctc	gac	tcg	gtc	gtg	ggg	aag	aac	1123
Thr	Leu	Ala	Gln	Val	Arg	Gln	Glu	Leu	Asp	Ser	Val	Val	Gly	Lys	Asn	
	325					330					335					
agg	ctc	gtg	tcc	gag	acc	gat	ctg	aat	cag	ctg	ccc	tat	cta	caa	gct	1171
Arg	Leu	Val	Ser	Glu	Thr	Asp	Leu	Asn	Gln	Leu	Pro	Tyr	Leu	Gln	Ala	
340					345					350					355	
gtc	gtc	aaa	gaa	act	ttc	cgc	ctc	cat	cct	ccg	acg	ccg	ctc	tct	cta	1219
Val	Val	Lys	Glu	Thr	Phe	Arg	Leu	His	Pro	Pro	Thr	Pro	Leu	Ser	Leu	
				360					365					370		

ccg aga ctc gcg gaa gat gat tgc gag atc gac gga tac ctc atc ccc 1267
 Pro Arg Leu Ala Glu Asp Asp Cys Glu Ile Asp Gly Tyr Leu Ile Pro 375 380 385
 aag ggc tcg acc ctt ctg gtg aac gtt tgg gcc ata gcc cgc gat ccc 1315
 Lys Gly Ser Thr Leu Leu Val Asn Val Trp Ala Ile Ala Arg Asp Pro 390 395 400
 aag gtt tgg gcc gat ccg ttg gag ttt agg ccc gaa cga ttc ttg acg 1363
 Lys Val Trp Ala Asp Pro Leu Glu Phe Arg Pro Glu Arg Phe Leu Thr 405 410 415
 ggc gga gaa aag gcc gac gtc gat gtc aag ggg aac gat ttc gaa gtg 1411
 Gly Gly Glu Lys Ala Asp Val Asp Val Lys Gly Asn Asp Phe Glu Val 420 425 430 435
 ata ccg ttc ggc gcg ggt cgt agg atc tgc gct ggc gtt ggc ttg gga 1459
 Ile Pro Phe Gly Ala Gly Arg Arg Ile Cys Ala Gly Val Gly Leu Gly 440 445 450
 ata cgt atg gtc caa ctg ttg acg gcg agt ttg atc cat gca ttc gat 1507
 Ile Arg Met Val Gln Leu Leu Thr Ala Ser Leu Ile His Ala Phe Asp 455 460 465
 ctg gac ctt gct aat ggg ctt ttg gcc caa aat ctg aac atg gaa gaa 1555
 Leu Asp Leu Ala Asn Gly Leu Leu Ala Gln Asn Leu Asn Met Glu Glu 470 475 480
 gca tat ggc ctt acg cta caa cgg gct gag cct ttg ttg gtc cac cct 1603
 Ala Tyr Gly Leu Thr Leu Gln Arg Ala Glu Pro Leu Leu Val His Pro 485 490 495
 agg ccg cgg ttg gcc act cat gtc tat taa ttaaattagg cctaaactac 1653
 Arg Pro Arg Leu Ala Thr His Val Tyr 500 505
 gatgaatgac ccatttaacg ttaataagag ttttcaattt atgtgagttt gcatgggtatg 1713
 gtatgggtatg gtgcttgtaa taaattgtat ctggttaggtg tgttcattga tgataaatct 1773
 agtttgtact gctgctcaaa aaaaaaaaaa aaaaaaaaaa aa 1815

<210> 19
 <211> 508
 <212> PRT
 <213> Torenia

<400> 19
 Met Ser Pro Leu Ala Leu Met Ile Ile Ser Thr Leu Leu Gly Phe Leu
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 Leu Tyr His Ser Leu Arg Leu Leu Leu Phe Ser Gly Gln Gly Arg Arg
 20 25 30
 Leu Leu Pro Pro Gly Pro Arg Pro Trp Pro Leu Val Gly Asn Leu Pro
 35 40 45
 His Leu Gly Pro Lys Pro His Ala Ser Met Ala Glu Leu Ala Arg Ala
 50 55 60
 Tyr Gly Pro Leu Met His Leu Lys Met Gly Phe Val His Val Val Val
 65 70 75 80
 Ala Ser Ser Ala Ser Ala Ala Glu Gln Cys Leu Arg Val His Asp Ala
 85 90 95
 Asn Phe Leu Ser Arg Pro Pro Asn Ser Gly Ala Lys His Val Ala Tyr
 100 105 110
 Asn Tyr Glu Asp Leu Val Phe Arg Tyr Gly Pro Lys Trp Arg Leu
 115 120 125

Leu	Arg	Lys	Ile	Cys	Ala	Gln	His	Ile	Phe	Ser	Val	Lys	Ala	Met	Asp
130						135					140				
Asp	Phe	Arg	Arg	Val	Arg	Glu	Glu	Glu	Val	Ala	Ile	Leu	Ser	Arg	Ala
145					150					155					160
Leu	Ala	Gly	Lys	Arg	Ala	Val	Pro	Ile	Gly	Gln	Met	Leu	Asn	Val	Cys
				165					170						175
Ala	Thr	Asn	Ala	Leu	Ser	Arg	Val	Met	Met	Gly	Arg	Arg	Val	Val	Gly
			180					185					190		
His	Ala	Asp	Gly	Thr	Asn	Asp	Ala	Lys	Ala	Glu	Glu	Phe	Lys	Ala	Met
		195					200					205			
Val	Val	Glu	Leu	Met	Val	Leu	Ser	Gly	Val	Phe	Asn	Ile	Gly	Asp	Phe
	210					215					220				
Ile	Pro	Phe	Leu	Glu	Pro	Leu	Asp	Leu	Gln	Gly	Val	Ala	Ser	Lys	Met
225					230					235					240
Lys	Lys	Leu	His	Ala	Arg	Phe	Asp	Ala	Phe	Leu	Thr	Glu	Ile	Val	Arg
				245					250						255
Glu	Arg	Cys	His	Gly	Gln	Ile	Asn	Asn	Ser	Gly	Ala	His	Gln	Asp	Asp
			260					265					270		
Leu	Leu	Ser	Thr	Leu	Ile	Ser	Phe	Lys	Gly	Leu	Asp	Asp	Gly	Asp	Gly
		275					280					285			
Ser	Arg	Leu	Thr	Asp	Thr	Glu	Ile	Lys	Ala	Leu	Leu	Leu	Asn	Leu	Leu
	290					295					300				
Asp	Thr	Thr	Ser	Ser	Thr	Val	Glu	Trp	Ala	Val	Ala	Glu	Leu	Leu	Arg
305					310					315					320
His	Pro	Lys	Thr	Leu	Ala	Gln	Val	Arg	Gln	Glu	Leu	Asp	Ser	Val	Val
				325					330						335
Gly	Lys	Asn	Arg	Leu	Val	Ser	Glu	Thr	Asp	Leu	Asn	Gln	Leu	Pro	Tyr
			340					345					350		
Leu	Gln	Ala	Val	Val	Lys	Glu	Thr	Phe	Arg	Leu	His	Pro	Pro	Thr	Pro
		355				360						365			
Leu	Ser	Leu	Pro	Arg	Leu	Ala	Glu	Asp	Asp	Cys	Glu	Ile	Asp	Gly	Tyr
	370					375					380				
Leu	Ile	Pro	Lys	Gly	Ser	Thr	Leu	Leu	Val	Asn	Val	Trp	Ala	Ile	Ala
385					390					395					400
Arg	Asp	Pro	Lys	Val	Trp	Ala	Asp	Pro	Leu	Glu	Phe	Arg	Pro	Glu	Arg
				405					410						415
Phe	Leu	Thr	Gly	Gly	Glu	Lys	Ala	Asp	Val	Asp	Val	Lys	Gly	Asn	Asp
			420					425					430		
Phe	Glu	Val	Ile	Pro	Phe	Gly	Ala	Gly	Arg	Arg	Ile	Cys	Ala	Gly	Val
		435				440						445			
Gly	Leu	Gly	Ile	Arg	Met	Val	Gln	Leu	Leu	Thr	Ala	Ser	Leu	Ile	His
	450					455					460				
Ala	Phe	Asp	Leu	Asp	Leu	Ala	Asn	Gly	Leu	Leu	Ala	Gln	Asn	Leu	Asn
465					470					475					480
Met	Glu	Glu	Ala	Tyr	Gly	Leu	Thr	Leu	Gln	Arg	Ala	Glu	Pro	Leu	Leu
			485					490						495	
Val	His	Pro	Arg	Pro	Arg	Leu	Ala	Thr	His	Val	Tyr				
			500					505							

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 <211> 1824
 <212> DNA
 <213> Jap. Morning Glory

<220>
 <221> CDS
 <222> (2)..(1555)

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 1 5 10 15

ttt ctt att ctc agg gtg aaa cag cgt tac cct tta cct ctc cca ccc	97
Phe Leu Ile Leu Arg Val Lys Gln Arg Tyr Pro Leu Pro Leu Pro Pro	
20 25 30	
gga cca aaa cca tgg ccg gtg tta gga aac ctt ccc cac ctg ggc aag	145
Gly Pro Lys Pro Trp Pro Val Leu Gly Asn Leu Pro His Leu Gly Lys	
35 40 45	
aag cct cac cag tcg att gcg gcc atg gct gag agg tac ggc ccc ctc	193
Lys Pro His Gln Ser Ile Ala Ala Met Ala Glu Arg Tyr Gly Pro Leu	
50 55 60	
atg cac ctc cgc cta gga ttc gtg gac gtg gtt gtg gcc gcc tcc gcc	241
Met His Leu Arg Leu Gly Phe Val Asp Val Val Val Ala Ala Ser Ala	
65 70 75 80	
gcc gtg gcc gct cag ttc ttg aaa gtt cac gac tcg aac ttc tcc aac	289
Ala Val Ala Ala Gln Phe Leu Lys Val His Asp Ser Asn Phe Ser Asn	
85 90 95	
cgg ccg ccg aac tcc ggc gcg gaa cac att gct tat aac tat caa gac	337
Arg Pro Pro Asn Ser Gly Ala Glu His Ile Ala Tyr Asn Tyr Gln Asp	
100 105 110	
ctc gtc ttc gcg ccc tac ggc ccg cgg tgg cgc atg ctt agg aag atc	385
Leu Val Phe Ala Pro Tyr Gly Pro Arg Trp Arg Met Leu Arg Lys Ile	
115 120 125	
acc tcc gtg cat ctc ttc tcg gcc aag gcg ttg gat gac ttc tgc cat	433
Thr Ser Val His Leu Phe Ser Ala Lys Ala Leu Asp Asp Phe Cys His	
130 135 140	
gtt cgc cag gaa gag gtt gca act ctg aca cgc agt cta gca agt gca	481
Val Arg Gln Glu Glu Val Ala Thr Leu Thr Arg Ser Leu Ala Ser Ala	
145 150 155 160	
ggc aaa act cca gta aaa cta ggg cag tta cta aac gtg tgc acc acg	529
Gly Lys Thr Pro Val Lys Leu Gly Gln Leu Leu Asn Val Cys Thr Thr	
165 170 175	
aac gcc cta gct cgt gta atg cta ggg cgg aag gtc ttt aat gac gga	577
Asn Ala Leu Ala Arg Val Met Leu Gly Arg Lys Val Phe Asn Asp Gly	
180 185 190	
ggt agc aag agc gac cca aag gcg gag gag ttc aag tcg atg gtg gag	625
Gly Ser Lys Ser Asp Pro Lys Ala Glu Glu Phe Lys Ser Met Val Glu	
195 200 205	
gag atg atg gtg ttg gcc gga agt ttt aac atc ggc gat ttc att ccg	673
Glu Met Met Val Leu Ala Gly Ser Phe Asn Ile Gly Asp Phe Ile Pro	
210 215 220	
gtc ttg ggt tgg ttt gac gtt cag ggt atc gta ggg aag atg aag aaa	721
Val Leu Gly Trp Phe Asp Val Gln Gly Ile Val Gly Lys Met Lys Lys	
225 230 235 240	
cta cac gcg cgt ttt gat gcg ttc ttg aac acc att cta gag gaa cac	769
Leu His Ala Arg Phe Asp Ala Phe Leu Asn Thr Ile Leu Glu Glu His	
245 250 255	
aaa tgt gtc aac aat caa cac acg acg ttg tcg aaa gat gtg gac ttc	817
Lys Cys Val Asn Asn Gln His Thr Thr Leu Ser Lys Asp Val Asp Phe	
260 265 270	

ttg agc acc cta att agg ctc aaa gat aat ggg gct gat atg gat tgt	865
Leu Ser Thr Leu Ile Arg Leu Lys Asp Asn Gly Ala Asp Met Asp Cys	
275 280 285	
gaa gag gga aaa ctc acc gac act gaa att aag gct ttg ctc ttg aac	913
Glu Glu Gly Lys Leu Thr Asp Thr Glu Ile Lys Ala Leu Leu Leu Asn	
290 295 300	
ctg ttc aca gct ggg act gat aca tca tct agc act gtg gag tgg gca	961
Leu Phe Thr Ala Gly Thr Asp Thr Ser Ser Ser Thr Val Glu Trp Ala	
305 310 315 320	
atc gca gaa cta cta cgc aac cca aaa atc tta aac caa gca caa caa	1009
Ile Ala Glu Leu Leu Arg Asn Pro Lys Ile Leu Asn Gln Ala Gln Gln	
325 330 335	
gag ctt gac tta gtg gtg ggt caa aat cag cta gtc aca gaa tct gac	1057
Glu Leu Asp Leu Val Val Gly Gln Asn Gln Leu Val Thr Glu Ser Asp	
340 345 350	
tta acc gat cta cct ttc ctg caa gca ata gtg aag gag acc ttc agg	1105
Leu Thr Asp Leu Pro Phe Leu Gln Ala Ile Val Lys Glu Thr Phe Arg	
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cta cac cca tcc acc cca ctc tct ctt cca aga atg gga gct cag ggt	1153
Leu His Pro Ser Thr Pro Leu Ser Leu Pro Arg Met Gly Ala Gln Gly	
370 375 380	
tgc gag atc aat ggc tac ttc atc ccc aaa ggc gca acg ctt ttg gtc	1201
Cys Glu Ile Asn Gly Tyr Phe Ile Pro Lys Gly Ala Thr Leu Leu Val	
385 390 395 400	
aac gtt tgg gcc ata gct cgt gat ccc aat gtg tgg aca aat cct ctt	1249
Asn Val Trp Ala Ile Ala Arg Asp Pro Asn Val Trp Thr Asn Pro Leu	
405 410 415	
gag ttc aac cca cac cga ttc ttg cct ggt gga gaa aag ccc aac gtg	1297
Glu Phe Asn Pro His Arg Phe Leu Pro Gly Gly Glu Lys Pro Asn Val	
420 425 430	
gat att aaa ggg aat gac ttt gaa gtg att cct ttt gga gcc ggg cgt	1345
Asp Ile Lys Gly Asn Asp Phe Glu Val Ile Pro Phe Gly Ala Gly Arg	
435 440 445	
aga ata tgc tct ggg atg agt ttg ggg ata agg atg gtt cac ctg ttg	1393
Arg Ile Cys Ser Gly Met Ser Leu Gly Ile Arg Met Val His Leu Leu	
450 455 460	
gtt gca act ttg gtg cat gct ttt gat tgg gat ttg gtg aat gga caa	1441
Val Ala Thr Leu Val His Ala Phe Asp Trp Asp Leu Val Asn Gly Gln	
465 470 475 480	
tct gta gag acg ctc aat atg gag gaa gct tat ggt ctc acc ctt caa	1489
Ser Val Glu Thr Leu Asn Met Glu Glu Ala Tyr Gly Leu Thr Leu Gln	
485 490 495	
cga gct gtt cct ttg atg ttg cat cca aag ccc aga tta caa cca cat	1537
Arg Ala Val Pro Leu Met Leu His Pro Lys Pro Arg Leu Gln Pro His	
500 505 510	
ctc tat act ctc aat taa attgcaattt gattttggtg attatacaat	1585
Leu Tyr Thr Leu Asn	
515	
tataatcgag ggacatagga tccccattta tttatatattca gttataagag acttccaaca	1645

aaggtctagc ttctgacctt aaaagttgta aaagaggtcc tacatatgta aaagccccgcc 1705
aaaggaaaac tggttgtatt caattccgct aggccttgtc cgaaagacct catgaagact 1765
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<212> PRT
<213> Jap. Morning Glory

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Gly Pro Lys Pro Trp Pro Val Leu Gly Asn Leu Pro His Leu Gly Lys
35 40 45
Lys Pro His Gln Ser Ile Ala Met Ala Glu Arg Tyr Gly Pro Leu
50 55 60
Met His Leu Arg Leu Gly Phe Val Asp Val Val Val Ala Ala Ser Ala
65 70 75 80
Ala Val Ala Ala Gln Phe Leu Lys Val His Asp Ser Asn Phe Ser Asn
85 90 95
Arg Pro Pro Asn Ser Gly Ala Glu His Ile Ala Tyr Asn Tyr Gln Asp
100 105 110
Leu Val Phe Ala Pro Tyr Gly Pro Arg Trp Arg Met Leu Arg Lys Ile
115 120 125
Thr Ser Val His Leu Phe Ser Ala Lys Ala Leu Asp Phe Cys His
130 135 140
Val Arg Gln Glu Glu Val Ala Thr Leu Thr Arg Ser Leu Ala Ser Ala
145 150 155 160
Gly Lys Thr Pro Val Lys Leu Gly Gln Leu Leu Asn Val Cys Thr Thr
165 170 175
Asn Ala Leu Ala Arg Val Met Leu Gly Arg Lys Val Phe Asn Asp Gly
180 185 190
Gly Ser Lys Ser Asp Pro Lys Ala Glu Glu Phe Lys Ser Met Val Glu
195 200 205
Glu Met Met Val Leu Ala Gly Ser Phe Asn Ile Gly Asp Phe Ile Pro
210 215 220
Val Leu Gly Trp Phe Asp Val Gln Gly Ile Val Gly Lys Met Lys Lys
225 230 235 240
Leu His Ala Arg Phe Asp Ala Phe Leu Asn Thr Ile Leu Glu Glu His
245 250 255
Lys Cys Val Asn Asn Gln His Thr Thr Leu Ser Lys Asp Val Asp Phe
260 265 270
Leu Ser Thr Leu Ile Arg Leu Lys Asp Asn Gly Ala Asp Met Asp Cys
275 280 285
Glu Glu Gly Lys Leu Thr Asp Thr Glu Ile Lys Ala Leu Leu Leu Asn
290 295 300
Leu Phe Thr Ala Gly Thr Asp Thr Ser Ser Ser Thr Val Glu Trp Ala
305 310 315 320
Ile Ala Glu Leu Leu Arg Asn Pro Lys Ile Leu Asn Gln Ala Gln Gln
325 330 335
Glu Leu Asp Leu Val Val Gly Gln Asn Gln Leu Val Thr Glu Ser Asp
340 345 350
Leu Thr Asp Leu Pro Phe Leu Gln Ala Ile Val Lys Glu Thr Phe Arg
355 360 365

Leu His Pro Ser Thr Pro Leu Ser Leu Pro Arg Met Gly Ala Gln Gly
370 375 380
Cys Glu Ile Asn Gly Tyr Phe Ile Pro Lys Gly Ala Thr Leu Leu Val
385 390 395 400
Asn Val Trp Ala Ile Ala Arg Asp Pro Asn Val Trp Thr Asn Pro Leu
405 410 415

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Pro	Ile	Leu	Gly	Asn	Ile	Pro	His	Leu	Gly	Ser	Lys	Pro	His	Gln	Thr	
1				5					10					15		
ctc	gcg	gaa	atg	gcg	aaa	acc	tac	ggc	ccg	ctc	atg	cac	ttg	aag	ttc	96
Leu	Ala	Glu	Met	Ala	Lys	Thr	Tyr	Gly	Pro	Leu	Met	His	Leu	Lys	Phe	
			20					25					30			
ggg	ctt	aag	gac	gcg	gtg	gtg	gcg	tcg	tct	gcg	tcg	gtg	gca	gag	cag	144
Gly	Leu	Lys	Asp	Ala	Val	Val	Ala	Ser	Ser	Ala	Ser	Val	Ala	Glu	Gln	
		35					40					45				
ttt	ctg	aag	aaa	cac	gac	gtg	aat	ttc	tgc	aac	cgg	ccg	cca	aac	tcc	192
Phe	Leu	Lys	Lys	His	Asp	Val	Asn	Phe	Ser	Asn	Arg	Pro	Pro	Asn	Ser	
	50					55					60					
ggg	gcc	aaa	cat	ata	gct	tat	aac	tat	cag	gac	ctg	gta	ttc	gct	ccc	240
Gly	Ala	Lys	His	Ile	Ala	Tyr	Asn	Tyr	Gln	Asp	Leu	Val	Phe	Ala	Pro	
65					70					75					80	
tat	gga	ccc	cgg	tgg	cgg	ttg	ctt	agg	aaa	atc	tgt	tcc	gtc	cat	ctt	288
Tyr	Gly	Pro	Arg	Trp	Arg	Leu	Leu	Arg	Lys	Ile	Cys	Ser	Val	His	Leu	
				85					90					95		
ttc	tgc	tct	aag	gcc	ttg	gat	gac	ttt	cag	cat	gtt	cga	cat	gag	gag	336
Phe	Ser	Ser	Lys	Ala	Leu	Asp	Asp	Phe	Gln	His	Val	Arg	His	Glu	Glu	
			100					105					110			
ata	tgc	atc	ctt	ata	cga	gca	ata	gcg	agt	ggc	ggc	cat	gct	ccg	gtg	384
Ile	Cys	Ile	Leu	Ile	Arg	Ala	Ile	Ala	Ser	Gly	Gly	His	Ala	Pro	Val	
		115					120					125				
aat	tta	ggc	aag	tta	tta	gga	gtg	tgc	aca	acc	aat	gcc	ctg	gca	aga	432
Asn	Leu	Gly	Lys	Leu	Leu	Gly	Val	Cys	Thr	Thr	Asn	Ala	Leu	Ala	Arg	
	130					135					140					
gtg	atg	ctt	gga	aga	aga	gta	ttc	gaa	ggc	gac	ggc	ggc	gag	aat	ccg	480
Val	Met	Leu	Gly	Arg	Arg	Val	Phe	Glu	Gly	Asp	Gly	Gly	Glu	Asn	Pro	
145					150					155					160	

cat	gcc	gac	gag	ttt	aaa	tca	atg	gtg	gtg	gag	att	atg	gtg	tta	gcc	528
His	Ala	Asp	Glu	Phe	Lys	Ser	Met	Val	Val	Glu	Ile	Met	Val	Leu	Ala	
				165					170					175		
ggt	gca	ttc	aac	ttg	ggt	gat	ttc	atc	ccg	gtt	cta	gat	tgg	ttc	gat	576
Gly	Ala	Phe	Asn	Leu	Gly	Asp	Phe	Ile	Pro	Val	Leu	Asp	Trp	Phe	Asp	
			180					185					190			
ttg	caa	gga	att	gct	ggt	aaa	atg	aag	aaa	ctt	cat	gcc	cgt	ttc	gac	624
Leu	Gln	Gly	Ile	Ala	Gly	Lys	Met	Lys	Lys	Leu	His	Ala	Arg	Phe	Asp	
		195					200					205				
aag	ttt	tta	aat	ggg	atc	cta	gaa	gat	cgt	aaa	tct	aac	ggc	tct	aat	672
Lys	Phe	Leu	Asn	Gly	Ile	Leu	Glu	Asp	Arg	Lys	Ser	Asn	Gly	Ser	Asn	
	210					215					220					
gga	gct	gaa	caa	tac	gtg	gac	ttg	ctc	agt	gtg	ttg	atc	tct	ctt	caa	720
Gly	Ala	Glu	Gln	Tyr	Val	Asp	Leu	Leu	Ser	Val	Leu	Ile	Ser	Leu	Gln	
225					230					235					240	
gat	agt	aat	atc	gac	ggt	ggt	gac	gaa	gga	acc	aaa	ctc	aca	gat	act	768
Asp	Ser	Asn	Ile	Asp	Gly	Gly	Asp	Glu	Gly	Thr	Lys	Leu	Thr	Asp	Thr	
				245					250					255		
gaa	atc	aaa	gct	ctc	ctt	ttg	aac	ttg	ttc	ata	gcc	gga	aca	gac	act	816
Glu	Ile	Lys	Ala	Leu	Leu	Leu	Asn	Leu	Phe	Ile	Ala	Gly	Thr	Asp	Thr	
			260					265					270			
tca	tca	agt	act	gta	gaa	tgg	gcc	atg	gca	gaa	cta	atc	cga	aac	cca	864
Ser	Ser	Ser	Thr	Val	Glu	Trp	Ala	Met	Ala	Glu	Leu	Ile	Arg	Asn	Pro	
		275					280					285				
aag	tta	cta	gtc	caa	gcc	caa	gaa	gag	cta	gac	aga	gta	gtc	ggg	ccg	912
Lys	Leu	Leu	Val	Gln	Ala	Gln	Glu	Glu	Leu	Asp	Arg	Val	Val	Gly	Pro	
	290					295					300					
aac	cga	ttc	gta	acc	gaa	tct	gat	ctt	cct	caa	ctg	aca	ttc	ctt	caa	960
Asn	Arg	Phe	Val	Thr	Glu	Ser	Asp	Leu	Pro	Gln	Leu	Thr	Phe	Leu	Gln	
305					310					315					320	
gcc	gtc	atc	aaa	gag	act	ttc	agg	ctt	cat	cca	tcc	acc	cca	ctc	tct	1008
Ala	Val	Ile	Lys	Glu	Thr	Phe	Arg	Leu	His	Pro	Ser	Thr	Pro	Leu	Ser	
				325					330					335		
ctt	cca	cga	atg	gcg	gcg	gag	gac	tgt	gag	atc	aat	ggg	tat	tat	gtc	1056
Leu	Pro	Arg	Met	Ala	Ala	Glu	Asp	Cys	Glu	Ile	Asn	Gly	Tyr	Tyr	Val	
			340					345					350			
tca	gaa	ggt	tcg	aca	ttg	ctc	gtc	aat	gtg	tgg	gcc	ata	gct	cgt	gat	1104
Ser	Glu	Gly	Ser	Thr	Leu	Leu	Val	Asn	Val	Trp	Ala	Ile	Ala	Arg	Asp	
		355					360					365				
cca	aat	gcg	tgg	gcc	aat	cca	cta	gat	ttc	aac	ccg	act	cgt	ttc	ttg	1152
Pro	Asn	Ala	Trp	Ala	Asn	Pro	Leu	Asp	Phe	Asn	Pro	Thr	Arg	Phe	Leu	
	370					375					380					
gcc	ggt	gga	gag	aag	cct	aat	gtt	gat	gtt	aaa	ggg	aat	gat	ttt	gaa	1200
Ala	Gly	Gly	Glu	Lys	Pro	Asn	Val	Asp	Val	Lys	Gly	Asn	Asp	Phe	Glu	
385					390					395					400	
gtg	ata	cct	ttc	ggt	gct	ggg	cgc	agg	ata	tgt	gcc	gga	atg	agc	tta	1248
Val	Ile	Pro	Phe	Gly	Ala	Gly	Arg	Arg	Ile	Cys	Ala	Gly	Met	Ser	Leu	
				405					410					415		

ggt ata cgg atg gtt caa cta gta acg gct tcg tta gtt cat tcg ttt 1296
 Gly Ile Arg Met Val Gln Leu Val Thr Ala Ser Leu Val His Ser Phe
 420 425 430

gat tgg gct ttg ttg gat gga ctt aaa ccc gag aag ctt gac atg gag 1344
 Asp Trp Ala Leu Leu Asp Gly Leu Lys Pro Glu Lys Leu Asp Met Glu
 435 440 445

gaa ggt tat gga cta acg ctt caa cga gct tca cct tta atc gtc cat 1392
 Glu Gly Tyr Gly Leu Thr Leu Gln Arg Ala Ser Pro Leu Ile Val His
 450 455 460

cca aag ccg agg ctc tcg gct caa gtt tat tgt atg taa caagtttgtg 1441
 Pro Lys Pro Arg Leu Ser Ala Gln Val Tyr Cys Met
 465 470 475

aagccagtct gatttcagtt ggattttgtag ttatttttatg atcatttggt attttatttt 1501

gtatttcggt tgaatacaat aaaggggaagg tggatcgctct gctgtataat agcgacgttt 1561

taacgtgttg tgatagtacc gtgttttact aaaacgatgt cgtttgattt tttatagtat 1621

taaaaaaaata aacagctgga ttttgaacca aaaaaaaaaa aaaaaa 1667

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 20 25 30
 Gly Leu Lys Asp Ala Val Val Ala Ser Ser Ala Ser Val Ala Glu Gln
 35 40 45
 Phe Leu Lys Lys His Asp Val Asn Phe Ser Asn Arg Pro Pro Asn Ser
 50 55 60
 Gly Ala Lys His Ile Ala Tyr Asn Tyr Gln Asp Leu Val Phe Ala Pro
 65 70 75 80
 Tyr Gly Pro Arg Trp Arg Leu Leu Arg Lys Ile Cys Ser Val His Leu
 85 90 95
 Phe Ser Ser Lys Ala Leu Asp Asp Phe Gln His Val Arg His Glu Glu
 100 105 110
 Ile Cys Ile Leu Ile Arg Ala Ile Ala Ser Gly Gly His Ala Pro Val
 115 120 125
 Asn Leu Gly Lys Leu Leu Gly Val Cys Thr Thr Asn Ala Leu Ala Arg
 130 135 140
 Val Met Leu Gly Arg Arg Val Phe Glu Gly Asp Gly Glu Asn Pro
 145 150 155 160
 His Ala Asp Glu Phe Lys Ser Met Val Val Glu Ile Met Val Leu Ala
 165 170 175
 Gly Ala Phe Asn Leu Gly Asp Phe Ile Pro Val Leu Asp Trp Phe Asp
 180 185 190
 Leu Gln Gly Ile Ala Gly Lys Met Lys Lys Leu His Ala Arg Phe Asp
 195 200 205
 Lys Phe Leu Asn Gly Ile Leu Glu Asp Arg Lys Ser Asn Gly Ser Asn
 210 215 220

Gly Ala Glu Gln Tyr Val Asp Leu Leu Ser Val Leu Ile Ser Leu Gln
 225 230 235 240
 Asp Ser Asn Ile Asp Gly Gly Asp Glu Gly Thr Lys Leu Thr Asp Thr
 245 250 255
 Glu Ile Lys Ala Leu Leu Leu Asn Leu Phe Ile Ala Gly Thr Asp Thr
 260 265 270

Ser	Ser	Ser	Thr	Val	Glu	Trp	Ala	Met	Ala	Glu	Leu	Ile	Arg	Asn	Pro
		275					280					285			
Lys	Leu	Leu	Val	Gln	Ala	Gln	Glu	Glu	Leu	Asp	Arg	Val	Val	Gly	Pro
	290					295					300				
Asn	Arg	Phe	Val	Thr	Glu	Ser	Asp	Leu	Pro	Gln	Leu	Thr	Phe	Leu	Gln
305					310					315					320
Ala	Val	Ile	Lys	Glu	Thr	Phe	Arg	Leu	His	Pro	Ser	Thr	Pro	Leu	Ser
				325					330					335	
Leu	Pro	Arg	Met	Ala	Ala	Glu	Asp	Cys	Glu	Ile	Asn	Gly	Tyr	Tyr	Val
			340					345					350		
Ser	Glu	Gly	Ser	Thr	Leu	Leu	Val	Asn	Val	Trp	Ala	Ile	Ala	Arg	Asp
		355					360					365			
Pro	Asn	Ala	Trp	Ala	Asn	Pro	Leu	Asp	Phe	Asn	Pro	Thr	Arg	Phe	Leu
	370					375					380				
Ala	Gly	Gly	Glu	Lys	Pro	Asn	Val	Asp	Val	Lys	Gly	Asn	Asp	Phe	Glu
385					390					395					400
Val	Ile	Pro	Phe	Gly	Ala	Gly	Arg	Arg	Ile	Cys	Ala	Gly	Met	Ser	Leu
				405					410					415	
Gly	Ile	Arg	Met	Val	Gln	Leu	Val	Thr	Ala	Ser	Leu	Val	His	Ser	Phe
			420					425					430		
Asp	Trp	Ala	Leu	Leu	Asp	Gly	Leu	Lys	Pro	Glu	Lys	Leu	Asp	Met	Glu
		435					440					445			
Glu	Gly	Tyr	Gly	Leu	Thr	Leu	Gln	Arg	Ala	Ser	Pro	Leu	Ile	Val	His
	450					455					460				
Pro	Lys	Pro	Arg	Leu	Ser	Ala	Gln	Val	Tyr	Cys	Met				
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 <213> Lisianthus

<220>
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tta ggt caa tta ctc ggg gtg tgt acc aca aat gct ctg gcg aga gtg 97
 Leu Gly Gln Leu Leu Gly Val Cys Thr Asn Ala Leu Ala Arg Val
 20 25 30

atg ctt gga agg agg gta ttc ggc gat ggg agc ggc ggc gta gat cct 145
 Met Leu Gly Arg Arg Val Phe Gly Asp Gly Ser Gly Val Asp Pro
 35 40 45

cag gcg gac gag ttc aaa tcc atg gtg gtg gaa atc atg gtg ttg gcc 193
 Gln Ala Asp Glu Phe Lys Ser Met Val Val Glu Ile Met Val Leu Ala
 50 55 60

ggc gcg ttt aat cta ggt gat ttt att ccc gct ctt gat tgg ttc gat 241
 Gly Ala Phe Asn Leu Gly Asp Phe Ile Pro Ala Leu Asp Trp Phe Asp
 65 70 75 80

ctg cag gga att acg gca aaa atg aag aaa gtt cac gct cgt ttc gat 289
 Leu Gln Gly Ile Thr Ala Lys Met Lys Lys Val His Ala Arg Phe Asp
 85 90 95

gcg ttc tta gac gcg atc ctt gag gag cac aaa tcc aac ggc tct cgc 337
 Ala Phe Leu Asp Ala Ile Leu Glu Glu His Lys Ser Asn Gly Ser Arg
 100 105 110

gga gct aag caa cac gtt gac ttg ctg agt atg ttg atc tcc ctt caa	385
Gly Ala Lys Gln His Val Asp Leu Leu Ser Met Leu Ile Ser Leu Gln	
115 120 125	
gat aat aac att gat ggt gaa agt ggc gcc aaa ctc act gat aca gaa	433
Asp Asn Asn Ile Asp Gly Glu Ser Gly Ala Lys Leu Thr Asp Thr Glu	
130 135 140	
atc aaa gct ttg ctt ctg aac ttg ttc acg gct gga aca gac acg tca	481
Ile Lys Ala Leu Leu Leu Asn Leu Phe Thr Ala Gly Thr Asp Thr Ser	
145 150 155 160	
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Ser Ser Thr Val Glu Trp Ala Ile Ala Glu Leu Ile Arg Asn Pro Glu	
165 170 175	
gta ttg gtt caa gcc caa caa gag ctc gat aga gta gtt ggg cca agt	577
Val Leu Val Gln Ala Gln Gln Glu Leu Asp Arg Val Val Gly Pro Ser	
180 185 190	
cgt ctt gtg acc gaa tct gat ctg cct caa ttg gca ttc ctt caa gct	625
Arg Leu Val Thr Glu Ser Asp Leu Pro Gln Leu Ala Phe Leu Gln Ala	
195 200 205	
gtc atc aaa gag act ttc aga ctt cat cca tcc act cca ctc tct ctt	673
Val Ile Lys Glu Thr Phe Arg Leu His Pro Ser Thr Pro Leu Ser Leu	
210 215 220	
cca cga atg gct tca gag ggt tgt gaa atc aat gga tac tcc atc cca	721
Pro Arg Met Ala Ser Glu Gly Cys Glu Ile Asn Gly Tyr Ser Ile Pro	
225 230 235 240	
aag ggt tcg aca ttg ctc gtt aac gta tgg tcc ata gcc cgt gat cct	769
Lys Gly Ser Thr Leu Leu Val Asn Val Trp Ser Ile Ala Arg Asp Pro	
245 250 255	
agt ata tgg gcc gac cca tta gaa ttt agg ccg gca cgt ttc ttg ccc	817
Ser Ile Trp Ala Asp Pro Leu Glu Phe Arg Pro Ala Arg Phe Leu Pro	
260 265 270	
ggc gga gaa aag ccc aat gtt gat gtg aga ggc aat gat ttt gag gtc	865
Gly Gly Glu Lys Pro Asn Val Asp Val Arg Gly Asn Asp Phe Glu Val	
275 280 285	
ata cca ttt ggt gct gga cgt agg ata tgt gct gga atg agc ttg ggt	913
Ile Pro Phe Gly Ala Gly Arg Arg Ile Cys Ala Gly Met Ser Leu Gly	
290 295 300	
tta aga atg gtt caa ctt tcg aca gct act ttg gtt cat tcg ttt aat	961
Leu Arg Met Val Gln Leu Ser Thr Ala Thr Leu Val His Ser Phe Asn	
305 310 315 320	
tgg gat ttg ctg aat ggg atg agc cca gat aaa ctt gac atg gaa gaa	1009
Trp Asp Leu Leu Asn Gly Met Ser Pro Asp Lys Leu Asp Met Glu Glu	
325 330 335	
gct tat ggg ctt aca ttg caa cgg gct tca cct ttg att gtc cac cca	1057
Ala Tyr Gly Leu Thr Leu Gln Arg Ala Ser Pro Leu Ile Val His Pro	
340 345 350	
aag ccc agg ctt gct agc tct atg tat gtt aaa tga aattatgctg	1103
Lys Pro Arg Leu Ala Ser Ser Met Tyr Val Lys	
355 360	
tgccaataat tccttattta tagcaggaaa tgtcatcttg aattatgtgt aatgttcttc	1163

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1214

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 <212> PRT
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 35 40 45
 Gln Ala Asp Glu Phe Lys Ser Met Val Val Glu Ile Met Val Leu Ala
 50 55 60
 Gly Ala Phe Asn Leu Gly Asp Phe Ile Pro Ala Leu Asp Trp Phe Asp
 65 70 75 80
 Leu Gln Gly Ile Thr Ala Lys Met Lys Lys Val His Ala Arg Phe Asp
 85 90 95
 Ala Phe Leu Asp Ala Ile Leu Glu Glu His Lys Ser Asn Gly Ser Arg
 100 105 110
 Gly Ala Lys Gln His Val Asp Leu Leu Ser Met Leu Ile Ser Leu Gln
 115 120 125
 Asp Asn Asn Ile Asp Gly Glu Ser Gly Ala Lys Leu Thr Asp Thr Glu
 130 135 140
 Ile Lys Ala Leu Leu Leu Asn Leu Phe Thr Ala Gly Thr Asp Thr Ser
 145 150 155 160
 Ser Ser Thr Val Glu Trp Ala Ile Ala Glu Leu Ile Arg Asn Pro Glu
 165 170 175
 Val Leu Val Gln Ala Gln Gln Glu Leu Asp Arg Val Val Gly Pro Ser
 180 185 190
 Arg Leu Val Thr Glu Ser Asp Leu Pro Gln Leu Ala Phe Leu Gln Ala
 195 200 205
 Val Ile Lys Glu Thr Phe Arg Leu His Pro Ser Thr Pro Leu Ser Leu
 210 215 220
 Pro Arg Met Ala Ser Glu Gly Cys Glu Ile Asn Gly Tyr Ser Ile Pro
 225 230 235 240
 Lys Gly Ser Thr Leu Val Asn Val Trp Ser Ile Ala Arg Asp Pro
 245 250 255
 Ser Ile Trp Ala Asp Pro Leu Glu Phe Arg Pro Ala Arg Phe Leu Pro
 260 265 270
 Gly Gly Glu Lys Pro Asn Val Asp Val Arg Gly Asn Asp Phe Glu Val
 275 280 285
 Ile Pro Phe Gly Ala Gly Arg Arg Ile Cys Ala Gly Met Ser Leu Gly
 290 295 300
 Leu Arg Met Val Gln Leu Ser Thr Ala Thr Leu Val His Ser Phe Asn
 305 310 315 320
 Trp Asp Leu Leu Asn Gly Met Ser Pro Asp Lys Leu Asp Met Glu Glu
 325 330 335
 Ala Tyr Gly Leu Thr Leu Gln Arg Ala Ser Pro Leu Ile Val His Pro
 340 345 350
 Lys Pro Arg Leu Ala Ser Ser Met Tyr Val Lys
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 <213> Petunia sp.

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<400> 26

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ctg gga ctg ttt ttc act tgg ttc ttg gtg aat gga ctc atg tca ctt 103
Leu Gly Leu Phe Phe Thr Trp Phe Leu Val Asn Gly Leu Met Ser Leu
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cga aga aga aaa atc tct aag aaa ctt cca cca ggt cca ttt cct ttg 151
Arg Arg Arg Lys Ile Ser Lys Lys Leu Pro Pro Gly Pro Phe Pro Leu
                                25                               30                               35

cct atc atc gga aat ctt cac tta ctt ggt aat cat cct cac aaa tca 199
Pro Ile Ile Gly Asn Leu His Leu Leu Gly Asn His Pro His Lys Ser
                                40                               45                               50                               55

ctt gct caa ctt gca aaa att cat ggt cct att atg aat ctc aaa tta 247
Leu Ala Gln Leu Ala Lys Ile His Gly Pro Ile Met Asn Leu Lys Leu
                                60                               65                               70

ggc caa cta aac aca gtg gtc att tca tca tca gtc gtg gca aga gaa 295
Gly Gln Leu Asn Thr Val Val Ile Ser Ser Ser Val Val Ala Arg Glu
                                75                               80                               85

gtc ttg caa aaa caa gac tta aca ttt tcc aat agg ttt gtc ccg gac 343
Val Leu Gln Lys Gln Asp Leu Thr Phe Ser Asn Arg Phe Val Pro Asp
                                90                               95                               100

gta gtc cat gtc cga aat cac tcc gat ttt tct gtt gtt tgg tta cca 391
Val Val His Val Arg Asn His Ser Asp Phe Ser Val Val Trp Leu Pro
                                105                               110                               115

gtc aat tct cga tgg aaa acg ctt cgc aaa atc atg aac tct agc atc 439
Val Asn Ser Arg Trp Lys Thr Leu Arg Lys Ile Met Asn Ser Ser Ile
                                120                               125                               130                               135

ttt tct ggt aac aag ctt gat ggt aat caa cat ctg agg tct aaa aag 487
Phe Ser Gly Asn Lys Leu Asp Gly Asn Gln His Leu Arg Ser Lys Lys
                                140                               145                               150

gtc caa gag tta att gat tat tgt caa aag tgt gcc aag aat ggc gaa 535
Val Gln Glu Leu Ile Asp Tyr Cys Gln Lys Cys Ala Lys Asn Gly Glu
                                155                               160                               165

gca gtg gat ata gga aga gca act ttt gga act act ttg aat ttg cta 583
Ala Val Asp Ile Gly Arg Ala Thr Phe Gly Thr Thr Leu Asn Leu Leu
                                170                               175                               180

tcc aac acc att ttc tct aaa gat ttg act aat ccg ttt tct gat tct 631
Ser Asn Thr Ile Phe Ser Lys Asp Leu Thr Asn Pro Phe Ser Asp Ser
                                185                               190                               195

gct aaa gag ttt aag gaa ttg gtt tgg aac att atg gtt gag gct gga 679
Ala Lys Glu Phe Lys Glu Leu Val Trp Asn Ile Met Val Glu Ala Gly
                                200                               205                               210                               215

aaa ccc aat ttg gtg gac tac ttt cct ttc ctt gag aaa att gat ccg 727
Lys Pro Asn Leu Val Asp Tyr Phe Pro Phe Leu Glu Lys Ile Asp Pro
                                220                               225                               230

caa ggt ata aag cga cgc atg act aat aat ttt act aag ttt ctt ggc 775
Gln Gly Ile Lys Arg Arg Met Thr Asn Asn Phe Thr Lys Phe Leu Gly
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ctt atc agc ggt ttg att gat gac cgg tta aag gaa agg aat cta agg	823
Leu Ile Ser Gly Leu Ile Asp Asp Arg Leu Lys Glu Arg Asn Leu Arg	
250 255 260	
gac aat gca aat att gat gtt tta gac gcc ctt ctc aac att agc caa	871
Asp Asn Ala Asn Ile Asp Val Leu Asp Ala Leu Leu Asn Ile Ser Gln	
265 270 275	
gag aac cca gaa gag att gat agg aat caa atc gag cag ttg tgt ctg	919
Glu Asn Pro Glu Glu Ile Asp Arg Asn Gln Ile Glu Gln Leu Cys Leu	
280 285 290 295	
gac ttg ttt gca gca ggg act gat act aca tcg aat acc ttg gag tgg	967
Asp Leu Phe Ala Ala Gly Thr Asp Thr Thr Ser Asn Thr Leu Glu Trp	
300 305 310	
gca atg gca gaa cta ctt cag aat cca cac aca ttg cag aaa gca caa	1015
Ala Met Ala Glu Leu Leu Gln Asn Pro His Thr Leu Gln Lys Ala Gln	
315 320 325	
gaa gaa ctt gca caa gtc att ggt aaa ggc aaa caa gta gaa gaa gca	1063
Glu Glu Leu Ala Gln Val Ile Gly Lys Gly Lys Gln Val Glu Glu Ala	
330 335 340	
gat gtt gga cga cta cct tac ttg cga tgc ata gtg aaa gaa acc tta	1111
Asp Val Gly Arg Leu Pro Tyr Leu Arg Cys Ile Val Lys Glu Thr Leu	
345 350 355	
cga ata cac cca gcg gct cct ctc tta att cca cgt aaa gtg gag gaa	1159
Arg Ile His Pro Ala Ala Pro Leu Leu Ile Pro Arg Lys Val Glu Glu	
360 365 370 375	
gac gtt gag ttg tct acc tat att att cca aag gat tca caa gtt cta	1207
Asp Val Glu Leu Ser Thr Tyr Ile Ile Pro Lys Asp Ser Gln Val Leu	
380 385 390	
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Val Asn Val Trp Ala Ile Gly Arg Asn Ser Asp Leu Trp Glu Asn Pro	
395 400 405	
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Leu Val Phe Lys Pro Glu Arg Phe Trp Glu Ser Glu Ile Asp Ile Arg	
410 415 420	
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Gly Arg Asp Phe Glu Leu Ile Pro Phe Gly Ala Gly Arg Arg Ile Cys	
425 430 435	
cct gga ttg cct ttg gct atg agg atg att cca gta gca cta ggt tca	1399
Pro Gly Leu Pro Leu Ala Met Arg Met Ile Pro Val Ala Leu Gly Ser	
440 445 450 455	
ttg cta aac tca ttt aat tgg aaa cta tat ggt gga att gca cct aaa	1447
Leu Leu Asn Ser Phe Asn Trp Lys Leu Tyr Gly Gly Ile Ala Pro Lys	
460 465 470	
gat ttg gac atg cag gaa aag ttt ggc att acc ttg gcg aaa gcc caa	1495
Asp Leu Asp Met Gln Glu Lys Phe Gly Ile Thr Leu Ala Lys Ala Gln	
475 480 485	
cct ctg cta gct atc cca act ccc ctg tag ctatagggat aaattaagtt	1545
Pro Leu Leu Ala Ile Pro Thr Pro Leu	
490 495	
gaggtttttaa gttactagta gattctattg cagctatagg atttctttca ccatcacgta 1605	

tgctttaccg ttggatgatg gaaagaaata tctatagctt tgggtttgtt tagtttgcac 1665
ataaaaaattg aatgaatgga ataccatgga gttataagaa ataataagac tatgattctt 1725
accctacttg aacaatgaca tggctatttc ac 1757

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<213> Petunia sp.

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Val Asn Gly Leu Met Ser Leu Arg Arg Lys Ile Ser Lys Lys Leu
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Pro Pro Gly Pro Phe Pro Leu Pro Ile Ile Gly Asn Leu His Leu Leu
35 40 45
Gly Asn His Pro His Lys Ser Leu Ala Gln Leu Ala Lys Ile His Gly
50 55 60
Pro Ile Met Asn Leu Lys Leu Gly Gln Leu Asn Thr Val Val Ile Ser
65 70 75 80
Ser Ser Val Val Ala Arg Glu Val Leu Gln Lys Gln Asp Leu Thr Phe
85 90 95
Ser Asn Arg Phe Val Pro Asp Val Val His Val Arg Asn His Ser Asp
100 105 110
Phe Ser Val Val Trp Leu Pro Val Asn Ser Arg Trp Lys Thr Leu Arg
115 120 125
Lys Ile Met Asn Ser Ser Ile Phe Ser Gly Asn Lys Leu Asp Gly Asn
130 135 140
Gln His Leu Arg Ser Lys Lys Val Gln Glu Leu Ile Asp Tyr Cys Gln
145 150 155 160
Lys Cys Ala Lys Asn Gly Glu Ala Val Asp Ile Gly Arg Ala Thr Phe
165 170 175
Gly Thr Thr Leu Asn Leu Leu Ser Asn Thr Ile Phe Ser Lys Asp Leu
180 185 190
Thr Asn Pro Phe Ser Asp Ser Ala Lys Glu Phe Lys Glu Leu Val Trp
195 200 205
Asn Ile Met Val Glu Ala Gly Lys Pro Asn Leu Val Asp Tyr Phe Pro
210 215 220
Phe Leu Glu Lys Ile Asp Pro Gln Gly Ile Lys Arg Arg Met Thr Asn
225 230 235 240
Asn Phe Thr Lys Phe Leu Gly Leu Ile Ser Gly Leu Ile Asp Asp Arg
245 250 255
Leu Lys Glu Arg Asn Leu Arg Asp Asn Ala Asn Ile Asp Val Leu Asp
260 265 270
Ala Leu Leu Asn Ile Ser Gln Glu Asn Pro Glu Glu Ile Asp Arg Asn
275 280 285
Gln Ile Glu Gln Leu Cys Leu Asp Leu Phe Ala Ala Gly Thr Asp Thr
290 295 300
Thr Ser Asn Thr Leu Glu Trp Ala Met Ala Glu Leu Leu Gln Asn Pro
305 310 315 320
His Thr Leu Gln Lys Ala Gln Glu Glu Leu Ala Gln Val Ile Gly Lys
325 330 335
Gly Lys Gln Val Glu Glu Ala Asp Val Gly Arg Leu Pro Tyr Leu Arg
340 345 350
Cys Ile Val Lys Glu Thr Leu Arg Ile His Pro Ala Ala Pro Leu Leu
355 360 365
Ile Pro Arg Lys Val Glu Glu Asp Val Glu Leu Ser Thr Tyr Ile Ile
370 375 380
Pro Lys Asp Ser Gln Val Leu Val Asn Val Trp Ala Ile Gly Arg Asn
385 390 395 400
Ser Asp Leu Trp Glu Asn Pro Leu Val Phe Lys Pro Glu Arg Phe Trp
405 410 415

Glu	Ser	Glu	Ile	Asp	Ile	Arg	Gly	Arg	Asp	Phe	Glu	Leu	Ile	Pro	Phe
			420					425					430		
Gly	Ala	Gly	Arg	Arg	Ile	Cys	Pro	Gly	Leu	Pro	Leu	Ala	Met	Arg	Met
		435					440					445			
Ile	Pro	Val	Ala	Leu	Gly	Ser	Leu	Leu	Asn	Ser	Phe	Asn	Trp	Lys	Leu
	450					455					460				
Tyr	Gly	Gly	Ile	Ala	Pro	Lys	Asp	Leu	Asp	Met	Gln	Glu	Lys	Phe	Gly
465					470					475					480
Ile	Thr	Leu	Ala	Lys	Ala	Gln	Pro	Leu	Leu	Ala	Ile	Pro	Thr	Pro	Leu
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<220>
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<210> 30
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<220>
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<210> 31
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<210> 32
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 <400> 33
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 <210> 34
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 <210> 36
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 <210> 37
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 <212> DNA
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20

<210> 38

<211> 28

<212> DNA

<213> Artificial Sequence

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<400> 38

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28

<210> 39

<211> 25

<212> DNA

<213> Artificial Sequence

<220>

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<400> 39

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25

<210> 40

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<212> DNA

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<400> 40

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17

<210> 41

<211> 32

<212> DNA

<213> Artificial Sequence

<220>

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<400> 41

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32